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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/647,215

08/26/2003

Satoshi Hada

2635-171

1895

23117 7590 01/09/2007

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EXAMINER

OLSEN, KAJ K

ART UNIT

PAPER NUMBER

1753

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

01/09/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

Application No.

10/647,215

Applicant(s)

HADA ET AL.

Examiner

Kaj K. Olsen

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1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-17 and 23-27 is/are allowed.
- 6) ☒ Claim(s) 18-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☒ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |  |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>8-26-03; 1-26-06</u> . | 6) <input type="checkbox"/> Other: ____  |

## DETAILED ACTION

### *Specification*

1. The disclosure is objected to because of the following informalities: Pages 28 and 29 of the specification refer to a pending US patent application. This application has matured into USP 6,870,142 and the specification should be corrected to refer to the patent number instead.

Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 18-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Suzuki et al (USP 6,336,354).

4. Suzuki discloses a gas concentration measuring apparatus comprising a gas sensor 100 including a cell (110, 120) and a heater 103. The cell has a solid electrolyte body working to produce a sensor signal in the form of a current change as a function of the concentration of a given component of a gas (see fig. 3(c) and col. 8, ll. 29-49) and the heater working to heat the solid electrolyte body (col. 7, ll. 40-49). Suzuki further discloses a measurement control circuit designed to perform a heater power supply control function working to control the supply of power to the heater using pulse width modulated (PWM) signal so as to place the heater in an on

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and off state cyclically to elevate the temperature of the solid electrolyte body. See fig. 11 and col. 11, l. 59 through col. 12, l. 48. The measurement control circuit also includes a high frequency component removing circuit in the form of a low-pass filter (LPF) 340 (430 in the figures), which removes high frequency components from the input of the sensor signal to produce a high-frequency removed signal. See fig. 9 and 12 and col. 13, ll. 1-45.

5. With respect to the set forth first and second cells and the use of lamination, see the pump and sensor cells (110, 120) of fig. 2 and col. 7, ll. 1-33.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki in view of Kurokawa et al (USP 2002/0050455 A1).

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9. With respect to claim 21, Suzuki set forth all the limitations of the claims, but did not explicitly disclose the presence of all three of a pump cell, sensor cell, and monitor cell. Suzuki teaches only the presence of the pump and sensor cells. Kurokawa teaches in an alternate NOx sensor the addition of a monitor cell 120 to the above pump and sensor cells (110, 130) for dissociating additional oxygen not dissociated by the pump cell and for compensating the sensor cell output for this additional oxygen. See fig. 1 and paragraphs 0087 and 0153. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Kurokawa for the sensor of Suzuki so as to dissociate residual oxygen and to correct the sensor cell output for this residual oxygen thereby providing a more accurate measured NOx concentration.

10. With respect to claim 22, Suzuki teaches that the pump cell should also have a high frequency removing circuit 330. See fig. 9 and col. 13, ll. 18-45.

***Allowable Subject Matter***

11. Claims 1-17 and 23-27 are allowed.

12. The following is a statement of reasons for the indication of allowable subject matter:

With respect to claim 1, the prior art does not disclose nor render obvious all the cumulative limitations of the claims with particular attention to the presence of an averaging function working to average the sensor signal for a given averaging time so that noise arising from a change in power supplied to the heater that is added to the sensor signal is canceled by an additional noise from a change in power supplied to the heater. With respect to claim 13, the prior art does not disclose nor render obvious all the cumulative limitations of the claims with

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particular attention to a measurement control circuit for sampling the sensor signal cyclically using each of the sampled values of the sensor signal where a sampled value in the current sampling circuit is corrected to a value within a range when the sampled value is greater than a given limit from a previous sampled value. With respect to claim 23, the prior art does not disclose nor render obvious all the cumulative limitations of the claim with particular attention to a sample availability determining circuit working to determine whether one of the samples acquired upon a switch between the on-state and the off-state of a heater is unavailable. Claims 2-12, 14-17, and 24-27 depend from these allowable claims and are also deemed to be free of the prior art for that reason.

### ***Conclusion***

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Patrick et al (USP 6,149,786) and Cox et al (USP 4,332,225) teach synchronizing the heater control with sensor measurement, but doesn't nor render obvious the averaging function of claim 1 or the sample availability determining circuit of claim 23.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaj Olsen whose telephone number is (571) 272-1344. The examiner can normally be reached on Monday through Friday from 8:00 A.M. to 4:30 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen, can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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December 29, 2006

  
KAJ K. OLSEN  
PRIMARY EXAMINER